Iowa Science Teachers Journal

Volume 20 | Number 2 Article 8

1983

A Look at Earth Science Teacher Needs

Peter A. Rubba
Southern Illinois University

A LOOK AT EARTH SCIENCE TEACHER NEEDS

Peter A. Rubba, Ed.D.
Associate Professor
Science and Environmental Education Center
Southern Illinois University
Carbondale, IL 62901

In preparation for designing a number of inservice activities for science teachers, the author completed a needs assessment on a random, stratified sample of the grade six through twelve science teachers in Illinois. The survey was carried out using the Moore Assessment Profile (MAP), an instrument which had been developed specifically to identify the needs of inservice science teachers.

The 117 items/need statements in the MAP are listed under six category headings:

1. The development of a better understanding of students
2. The betterment of diagnosis and evaluation practices
3. The development of better classroom instruction management practices
4. The improvement of classroom instruction and planning
5. The more effective use of instructional materials
6. The self-improvement of the classroom science teacher. (Moore, 1977)

Further details on the methodology used in the study, and of the MAP need statements identified by the junior high, biology, chemistry and physics teachers in the sample, can be found in Rubba (1981). For this paper the MAP instruments returned by the junior and senior high school earth science teachers ($n = 34$) were analyzed to determine the need statements identified by at least 75 percent of them.

Top Inservice Needs

Thirteen MAP need statements were identified as either "much needed" or "moderately needed" by 75 percent or more of the earth science teachers. Those 13 need statements are listed in Table 1, rank ordered by the percentage of earth science teachers who marked the "much needed" *and* the "moderately needed" responses for each. Also noted in Table 1 is the MAP category under which each need statement was listed.

Table 1
The Earth Science Teachers' Top 13 Needs

Rank		MAP Category-Need Statement	%
1	4-24	Developing better science reasoning skills in students	90.1
2.5	4-27	Developing in students an understanding of the interrelationships that exist between science and everyday life	88.2
2.5	4-29	Developing in students an understanding of the interrelationships that exist between science and other school subjects	88.2
5	1-17	Understanding the influence of the community on a student's learning	85.3
5	4-25	Developing in students an appreciation of science	85.3
5	5-12	Obtaining special materials and equipment in order to provide more effective science teaching	85.3
8.5	4-13	Making science meaningful to students	82.3
8.5	4-22	Developing in students effective habits of science learning and study	82.3
8.5	4-23	Developing in students skills in creative thinking	82.3
8.5	4-28	Developing in students an understanding of the interrelationships that exist between science and living things	82.3
11	1-8	Motivating students to learn through a greater knowledge of students' interests	79.5
12.5	4-19	Presenting science so that students arrive at principles from specific experiences	76.4
12.5	4-31	Overcoming difficulties encountered in providing excursions outside the classroom (locating suitable places, transportation, approval, funds)	76.4

The top 13 need statements indicated by the earth science teachers were distributed across three of the six categories of need contained in the MAP, with between 75 percent and 90 percent of the teachers registering need for each. Ten of these need statements were from category 4, "The improvement of classroom instruction and planning". Two need statements were from category 1, "The development of a better understanding of students", and one statement was from category 5, "The more effective use of instructional materials".

Six of the top needs expressed by the earth science teachers indicate great concern on the teachers' part for improving their instructional effectiveness. The teachers specified needs for learning how to develop their students' study skills (need statement 4-22), reasoning skills (need statement 4-24) and creative thinking abilities (need statement 4-23). They expressed needs for learning how to use community factors (need statement 1-17) and students' interests (need statement 1-8) to motivate learning. The teachers also requested further help in presenting inquiry organized earth science lessons (need statement 4-19).

Five of the needs designated by the earth science teachers were associated with helping students gain an understanding of and appreciation for science (need statements 4-13 and 4-25) as it relates to everyday life (need statements 4-17 and 4-28), and to other school subjects (need statement 4-29). It would appear that the teachers wished to place greater emphasis upon these goals in the earth science instruction they provided. The needs expressed for help in securing special materials and equipment, and in arranging field trips (need statements 4-31 and 5-12) are most likely associated with tight school budgets.

Synopsis

The MAP survey data for the earth science teachers showed that 75 percent or more of those teachers identified 13 need statements. Ten of the 13 need statements were associated directly with the planning and implementaton of science instruction. The other three needs were in the closely related areas of better understanding students and use of instructional materials. Inservice activities planned around the 13 need statements presented in this report should be well accepted by large numbers of junior high school and high school earth science teachers. Still, those who arrange inservice activities for earth science teachers should not forget the cardinal principle of inservice education — plan inservice activities based upon the specific needs of participating teachers.

References

Moore, Kenneth D. 1977. Development and validation of a science teacher needs assessment profile. *Journal of Research in Science Teaching. 14*(2): 145-149.

Rubba, Peter A. 1981. A survey of Illinois secondary school science teacher needs. *Science Education 65*(3): 271-276.

AVERAGE HEAT OF COMBUSTION AND AVAILABLE ENERGY OF CARBOHYDRATE, FAT AND PROTEIN

H. I. Feinstein
10411 Forest Avenue
Fairfax, VA 22030

The food energy of carbohydrate, fat and protein recorded in many nutrition tables is the net available energy. It is equal to 16.7, 37.7, and 16.7 kilojoules per gram respectively. These are not the same as the heat of combustion determined calorimetrically. The relationships between them is shown in the table.

	Calorimetric Heat of Combustion kJ/g (kcal/g)		Available to Body kJ/g (kcal/g)		Atwater Factor*	Net Available Energy or Body Fuel Value kJ/g (kcal/g)	
Carbohydrate	17.2	(4.1)	17.2	(4.1)	0.97	16.7	(4.0)
Fat	39.8	(9.5)	39.8	(9.5)	0.95	37.7	(9.0)
Protein	23.9	(5.7)	18.4	(4.4)**	0.92	16.7	(4.0)

* The Atwater factor is the fraction absorbed from the alimentary canal in a mixed diet.

** The oxidation of protein by the body is incomplete as shown by the presence of certain nitrogen compounds in the urine (e.g. urea, creatinine, uric acid). This is equivalent to 5.4 kJ/g (1.3 kcal/g) of protein. Therefore, $23.8_6 - 5.4_1 = 18.4$ kJ/g ($5.7 - 1.3 = 4.4$ kcal/g).